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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/816,784	03/26/2001	Kazuhiro Hattori	010328	5542
23850	7590	07/14/2004	EXAMINER	
ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP 1725 K STREET, NW SUITE 1000 WASHINGTON, DC 20006			VINH, LAN	
			ART UNIT	PAPER NUMBER
			1765	

DATE MAILED: 07/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/816,784

Applicant(s)

HATTORI, KAZUHIRO

Examiner

Lan Vinh

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 5/6/2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 8-28 is/are pending in the application.
- 4a) Of the above claim(s) 8 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 9-12 and 18-25 is/are rejected.
- 7) ☒ Claim(s) 13-17 and 26-28 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 09/816,784.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 22-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 22-25 recites the limitation "side etching" in claims 9, 10, 11, 12. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 9, 10, 11, 18, 19-20, 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hara et al (US 5,946,167) in view of Kikitsu et al (US 6,602,620)

Hara discloses a method for forming a magnetoresistive sensor by etching. This method comprises the steps of :

forming a layer 16 of magnetic bias material such as CoPt/Cobalt platinum alloy, the layer 16 is selectively etched (col 5, lines 24-25, fig. 13(c))

forming a patterned masking layer 17 of Ta/Tantalum on layer 16 (col 8, lines 12-13, fig. 13(b))

anisotropic etching/reactive ion etching the CoPt layer 16 using layer 17 as a mask (col 7, lines 33-34; col 13, lines 49-51)

Unlike the instant claimed inventions as per claims 9, 10, 11, 12, Hara fails to specifically disclose RIE etching the CoPt alloy layer/magnetic material layer under a reaction gas of a carbon monoxide/Co with an additive of a nitrogen compound gas.

Kikitsu discloses a method of manufacturing a magnetic medium comprises the step of plasma etching a magnetic material layer such as Co alloy using a mixture of CO and nitrogen compound gas such as  $\text{NH}_3$  (col 9, lines 50-55, col 49, lines 59-65)

Since Hara discloses etching the CoPt layer 150 using RIE etching, one skilled in the art would have found it obvious to modify Hara's etching step by using a mixture of CO and nitrogen compound gas such as  $\text{NH}_3$  as per Kikitsu because Kikitsu states that plasma generated in CO and/or ammonia/  $\text{NH}_3$  can be employed as a RIE reaction gas for etching the magnetic material (col 21, lines 40-43)

Regarding claims 18-20, fig. 13(c) of Hara shows that masking layer 17 is not substantially deformed during etching which reads on a ratio of etch rate between the mask and the CoPt layer is substantially large

Regarding claims 22-24, fig. 13 (c ) of Hara shows that the side of layer 16 is not being etched from the edge of masking layer 17.

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4. Claims 12, 21, 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hara et al (US 5,946,167) in view of Kikitsu et al (US 6,602,620) and further in view of DeOrnellas et al (6,287,975)

Hara as modified by Kikitsu has been discussed above in paragraph 3. Hara and Kikitsu differ from the instant claimed inventions as per claim 12 by using a masking layer of Ta instead of TaN

DeOrnellas discloses a method for using an hard mask of Ta/TaN in a plasma etching step (col 4, lines 3-6)

Hence, one skilled in the art would have found it obvious to modify Hara and Kikitsu by using a TaN masking layer as per DeOrnellas because according to DeOrnellas, Ta and TaN are the most appropriate reactive metals for hard mask layer (col 5, lines 9-17)

Regarding claim 21, fig. 13(c) of Hara shows that masking layer 17 is not substantially deformed during etching which reads on a ratio of etch rate between the mask and the CoPt layer is substantially large

Regarding claim 25, fig. 13 (c ) of Hara shows that the side of layer 16 is not being etched from the edge of masking layer 17.

***Allowable Subject Matter***

5. Claims 13, 14, 15, 16, 17, 26, 27, 28 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

6. Applicant's arguments with respect to the reference of Gibbons have been considered but are moot in view of the new ground(s) of rejection based on the primary reference of Hara et al (US 5,946,167).

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

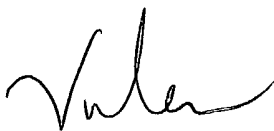
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lan Vinh whose telephone number is 571 272 1471. The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571 272 1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



LV  
July 12, 2004